



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

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Application No.: 09/530,196

Group Art Unit: 1754

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Examiner: Edward M. Johnson

For: METALLIC PLATE OF RESIN STRUCTURE HAVING  
PHOTOCATALYST-SUPPORTING FILM LAMINATED THERETO

DECLARATION UNDER 37 CFR §1.132

COMMISSIONER FOR PATENTS

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Sir:

I, Shinji ABE, hereby declare and state that:

1. I am a citizen of Japan, residing in Edogawa-ku, Tokyo, Japan
2. I am one of the inventors of the subject application, and I am fully familiar with the subject matter thereof as well as the references relied upon by the Examiner in the prosecution of this application.
3. I obtained a Master's degree in the department of Engineering Research at Hokkaido University Graduate School in March 1986.

4. I am currently employed by Nippon Soda Co., Ltd. and began working for Nippon Soda Co., Ltd., in April, 1986, at inorganic material and inorganic-organic composite material research and development in Odawara laboratory. From April, 1998, I engaged at photocatalyst research department in R&D Laboratory for specialty chemicals. From April, 2003, I engaged at R & D coordination Department in Research & Technology Division. From April, 2005, I have engaged at Electronics materials development department in Research & Technology Division.

5. I conducted the following experiments.

### **I. Object**

With regard to the reference (United States Patent No. 6,288,480) which was cited in the Final Office Action (dated April 19, 2005) issued on the present application (U.S. Patent Application, No. 09/530,196), tests were conducted to provide supplemental data that the significant effect of the present invention can be obtained when heat-pressing the photocatalyst-supporting film onto a surface of a metallic plate or a resin substrate at a temperature range from 60 to 200°C after forming the photocatalyst layer, and that such effect cannot be obtained when the photocatalyst-supporting film is **not** heated after forming the photocatalyst layer as disclosed in the reference.

### **II. Example**

#### **1. Preparing samples**

Fulcon KN-C2000, which is a tent cloth canvas produced by KURARAY CO., LTD., including vinyl chloride and plasticizer was used as a polymer resin base.

First, the Fulcon KN-C2000 was cut into A4 size and applied with a coating solution for an adhesive layer and the coating solution was dried for 30 minutes at 60 °C to form an adhesive layer, wherein polysiloxane (methylsilicate 51, Colcoat Co., Ltd.) in amount of 30% by weight relative to the weight of the acryl-silicon resin and a surface active agent were added to xylene-isopropanol solution (50/50 ratio by weight), which contains an acryl-silicon resin having silicon at a concentration of 3% by weight in an

amount of 10 % by weight, to prepare a coating solution for an adhesive layer. The thickness of the adhesive layer was about 0.5  $\mu\text{m}$ .

Next, after cooling at room temperature, a coating solution for a photo catalyst layer was applied to the above adhesive layer and dried for 30 minutes at 60 °C, wherein acidic titanium nitrate sol which contains titanium oxide at a concentration of 5% by weight was dispersed in acidic silica nitrate sol which contained silicon oxide at a concentration of 5% by weight in the presence of a surface active agent to prepare a coating solution for a photocatalyst layer. The thickness of the photo catalyst layer was about 0.6  $\mu\text{m}$ .

Then, the dried photo catalyst layer was reheated by spraying high temperature air at 3.0 m/minute.

Based on the above method, samples were obtained. The samples were a photocatalyst-supporting film without reheating, a photocatalyst-supporting film reheated at 100 °C, and a photocatalyst-supporting film reheated at 200 °C.

## 2. Test for the samples

For the test regarding the function of the photocatalyst, the color difference of each sample before and after being exposed in the open air was measured, wherein the exposure period was 6 weeks and the wavelength range of the color difference measurement was from 380 nm to 780 nm.

The color difference of each sample was as follows;

Table 1

Sample	Color difference
Non-reheated	6.98
Reheated at 100 °C	4.61
Reheated at 200 °C	2.60

## III. Conclusion

By comparing the results of the non-reheated sample and the reheated samples, it is clear that the color difference of the reheated sample is less than that of the non-reheated sample, meaning that the reheated samples have greater antifouling

property than that of the non-reheated sample. The antifouling property depends on the function of a photocatalyst, in which a photocatalyst activates decomposing chemical reactions with ultraviolet radiation energy, such as a chemical reaction resulted in during a process of pasteurization and decomposition of organic substance. Thus, because high function of photocatalyst means activating chemical reaction to exert antifouling property, a sample having a high function of photocatalyst does not cause change of color. Therefore, when the sample has a low color difference, this means that the function of photocatalyst in the sample is high.

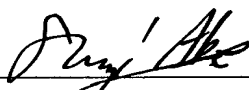
Accordingly, the above test shows that the function of a photocatalyst is strengthened by reheating the photocatalyst layer after drying a photocatalyst coating liquid.

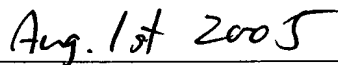
We believe the significant difference in the color difference between the present invention and the reference demonstrates that the photocatalyst-supporting film disclosed in the reference, which is **not** heated after forming the photocatalyst layer, is not within the scope of the present application.

6. I understand fully the content of this declaration.

7. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

8. Further declarant saith not.

  
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Shinji ABE

  
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Date